In the Office Action, the Examiner noted that claims 1-11, 13, 14 and 17-26 are pending in the application. These claims continue unamended.

In view of the following discussion, the Applicants submit that none of the claims now pending in the application are obvious under the provisions of 35 U.S.C. §103. Thus, the Applicants believe that all these claims are now in allowable form.

REJECTION OF CLAIMS 1-3, 11, AND 21-23 UNDER 35 U.S.C.§103(a)

The Examiner has rejected (per comment 1 of the Office Action) claims 1-3, 11 and 21-23 under 35 U.S.C. §103(a) as being unpatentable over the Adelson patent (U.S. Patent No. 5,706,417 issued January 6, 1999) in view of the Yeo et al. patent (U.S. Patent No. 5,821,945 issued October 13, 1998) and the Shibata et al. paper ("content-based structuring of video information published by the IEEE in 1996). The Applicants respectfully disagree and traverse.

The Examiner is respectfully directed to the discussion regarding both Adelson and Yeo in Applicants' response of October 10, 1999 to the Office Action of July 12, 1999.

As noted in the previous response, there is absolutely no teaching in the Adelson reference of combining background imagery from different frames to form a key or anchor background image which is then associated with a plurality of foreground images, such as depicted in FIG. 7 of the subject application.

As noted by the Examiner in comment 1 of the present Office Action: "Adelson does not teach segmenting a video stream into scenes, and scenes into frames including a key frame, and the use of intra-scene motion analysis." The Applicants thank the Examiner for noting this crucial distinction.

As noted in the previous response, the Yeo arrangement simply does not teach the "key frame" limitation of claim 1. Specifically, the "key frame" described in column 1 of the Yeo arrangement is simply a single image frame representative of a first frame in a segment of video frames where a sequence of equal length video frame segments (including respective key frames or first frames) is used to represent a video stream. Thus, the "key frame" of Yeo is simply the first frame occurring within a segment of video frames. Thus, since the Yeo arrangement divides sequences into equal length segments, the first frame within a segment is not necessarily related to the remaining frames within the segment. That is, unlike the subject invention, the segments provided in Yeo may include inter-scene transitions. Such inter-scene transitions are avoided within the present invention, thereby avoiding visual discontinuities and poor recovery/prediction of non-key frames within a scene.

The Examiner contends that Shibata "teaches segmenting a video sequence, with individual video frames being the smallest unit of any segment [and] the use of a basic segment which is a collection of video frames having the same vector expressions, assuming a collection of basic segments as the initial layer, and creating new layers by adding a segment to the previously processed layer, thus teaching a method for providing background mosaic, and intra-scene motion analysis." The Applicant respectfully disagrees. In fact, the Shibata reference has to do with the subject invention.

As discussed during the telephone interview, it is respectfully submitted that the Examiner has misconstrued the teachings of Shibata. For example, The collection of "basic segments" forming an initial layer and the creation of new layers by averaging segment pairs in previous layers is

construed as teaching a method for providing a background mosaic and for teaching intra-scene motion analysis. This is simply not the case, as will be discussed below.

Shibata teaches content-based structuring of video information using textual descriptions. It is noted that Shibata defines (per Section 3.1) "video structuring" as an operation which divides a video sequence into "segments" and describes the hierarchical relations between them. It is also noted that the description in Shibata of the relations between segments is a textual description intended to provide a human readable description of the underlying video scene such that the underlying video may be readily processed within the context of a video editing environment or studio environment, e.g. by a director. Specifically, a descriptive component (DC) is defined by Shibata as key words or elemental words that constitute short sentences which may be divided into several groups (see Section 2.). With respect to video structuring, the categories of visual objects, actions of the object, and state of the object are used. The descriptive components (DCs) are mapped (see FIG. 1) as a script which indicates the presence or absence of particular descriptive components within the video sequence in time.

The "vector expressions" of Shibata are not motion vectors. Rather (per section 3.1), the Shibata "vector expressions" are merely representations of the duration of descriptive components in terms of time or segment length. The Shibata "vector expressions" should not be equated with the motion vectors discussed in the instant patent application.

It can be seen in FIG. 2 of Shibata that each "layer" is formed by averaging "basic segments" of a lower layer. That is, as depicted in FIG. 2, where M basic segments are provided, the M^{th} layer includes the M "basic segments." By averaging the

vector expressions of respective adjacent basic segments within the M^{th} layer, an M^{th} minus 1 layer is formed which includes M/2 basic segments. Each of the M/2 basic segments comprises the averaged vector expressions of the two basic segments within the M^{th} layer. Similarly, for each succeeding layer, respective pairs of basic segments or derived (i.e., averaged) basic segments are themselves averaged to produce the next layer. A top layer or M = 1 layer comprises the average of all of the vector expressions of the basic segments forming the M^{th} layer. This averaging or decimation of information on a layer-by-layer basis cannot be construed to teach the intrascene layering of the subject invention. In fact, it is impossible to reconstruct lower layer video information using the upper layer information

Since the references, either singly or in combination, do not disclose or suggest the claimed invention, it is respectfully submitted that the invention of claim 1 is patentable over the cited references.

Moreover, since independent claims 17 and 21 include limitations similar to those found in independent claim 1, it is submitted that claims 17 and 21 are patentable for at least the reasons discussed above with respect to claim 1. Therefore, the Applicants submit that claims 1, 17 and 21 as they now stand fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Furthermore, all of the remaining claims depend, either directly or indirectly, from claims 1, 17 or 21 and recite additional features therefrom. As such, and for the exact same reasons set forth above, the Applicants submit that none of these claims are obvious with respect to the teachings of the cited references either singly or in combination. Therefore, the Applicants submit that all these dependent claims also fully

satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Rejection of Claims Under 35 U.S.C. §103(a) Predicated Upon the Shibata et al. Reference

The Examiner has rejected claims 4 and 24 (per comment 2 of the Office Action), claims 5-8 (per comment 3 of the Office Action), claims 9-10 (per comment 4 of the Office Action), claims 13-14 (per comment 5 of the Office Action), claims 17-20 (per comment 8 of the Office Action), and claims 25-26 (per the second comment 3 of the Office Action) as being unpatentable under 35 U.S.C. §103(a) over the Adelson patent in view of the Yeo et al. patent and the Shibata et al. reference and in further view of one or more of the Jaillon et al. paper (Image Mosaicing Applied to Three Dimensional Services, 1051-4651/94-1994 IEEE), the Barber et al. patent (U.S. Patent No. 5,751,286 issued May 12, 1998) and the Zhang et al. patent (U.S. Patent No. 5,635,982).

The Applicants respectfully traverse. The Examiner is respectfully directed to the above discussion in this response and a prior Office Action response of the Adelson and Yeo patents. Further, the Examiner is respectfully directed to the above discussion of the Shibata reference as applied to independent claims 1, 17 and 21, from which each of the additional rejected claims depends, either directly or indirectly. It is respectfully submitted that since the Shibata patent fails to disclose or suggest or even remotely bridge the gap between the subject invention of independent claims 1, 17 and 21, the addition of any of the additional references, either singly or in combination, also fails to disclose or suggest the necessary teaching to bridge the gap between the Adelson and Yeo

arrangements and the subject invention. Thus, it is respectfully submitted that for at least the reasons discussed above with respect to independent claims 1, 17 and 21, each of the dependent claims is also patentable.

CONCLUSION

Thus, the Applicants submit that none of the claims presently in the application are obvious under the provisions of 35 U.S.C. §103. Consequently, the Applicants believe all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited. If, however, the Examiner believes that there are any unresolved issues requiring adverse action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Eamon J. Wall, Esq. at 732-530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

2/24/00

E J Wall

Eamon J. Wall, Attorney
Reg. No. 39,414
(732) 530-9404

Thomason, Moser & Patterson LLP
Attorneys at Law
The Galleria
2-40 Bridge Avenue, P.O. Box 8160
Red Bank, New Jersey 07701